

Syllabus: CSC 484/284 Fall 2023

This syllabus is subject to change.

Course: CSC 484/284: Advanced Algorithms

Instructor: Kaave Hosseini kaave.hosseini@rochester.edu

Lecture: TTh 12:30 PM - 1:45 PM Location: Hylan Building Room 203

Office hours: T 2:00 PM - 3:00 PM Location: Wegmans 2507

Course material Here is a tentative list of topics: matrix multiplication, fast fourier transform and its applications, hashing, deviation bounds, sampling, load balancing, routing, algebraic and combinatorics algorithms for matching, satisfiability algorithms, error correcting codes, secret sharing, max flow, min-cut, expander graphs, spectral clustering, linear programming, semidefinite programming, dimension reduction, online algorithms, and multiplicative weight updates.

Prerequisites Students are expected to have familiarity with undergraduate-level algorithms, discrete mathematics, graph theory, linear algebra, and probability.

Resources We will be using a number of resources for this class, some of which are the following.

1. Lecture Notes by Sanjeev Arora (Princeton)
<https://www.cs.princeton.edu/courses/archive/fall15/cos521/main.pdf>
2. Lecture Notes by Pravesh Kothari, Christopher Musco (Princeton)
<https://www.cs.princeton.edu/courses/archive/fall18/cos521/>
3. Lecture Notes by Shayan Oveis-Gharan (U of Washington)
<https://courses.cs.washington.edu/courses/cse521/20au/>
4. Lecture Notes by Shachar Lovett (UC San Diego)
<https://cseweb.ucsd.edu/classes/sp16/cse291-a/notes.pdf>

5. Book Draft by Anupam Gupta (CMU)
<http://www.cs.cmu.edu/~15850/notes/cmu850-f20.pdf>
6. Book Draft by Luca Trevisan (Stanford)
<https://theory.stanford.edu/~trevisan/books/cs261.pdf>
7. Lecture Notes by Venkatesan Guruswami and Ravi Kannan (CMU)
<https://www.cs.cmu.edu/~venkatg/teaching/CStheory-infoage/hopcroft-kannan-feb2012.pdf>

Assessment Evaluation will be based on five homework assignments and will consist of 95% of the total grade. The other 5% is based on class attendance.

Homework assignments There will be an assignment roughly every other week. Students can solve each assignment in groups of size at most two, however, each student should write down their final solution individually. Every student should submit their solutions to Piazza. Late assignments are not permitted unless in urgent situations. Groups can change for every assignment.

Communication Announcements, homework assignments, discussions, etc. will be posted on Slack.

Academic Integrity Students must follow UR's Code of Academic Integrity:
<https://www.rochester.edu/college/honesty/policy/index.html>

Disability resources The University of Rochester respects and welcomes students of all backgrounds and abilities. In the event you encounter any barrier(s) to full participation in this course due to the impact of a disability, please contact the Office of Disability Resources. The access coordinators in the Office of Disability Resources can meet with you to discuss the barriers you are experiencing and explain the eligibility process for establishing academic accommodations. You can reach the Office of Disability Resources at: disability@rochester.edu; (585) 276-5075; Taylor Hall; www.rochester.edu/college/disability.